

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. – 3. (Cancelled)

4. (Currently Amended) ~~The porous glass composite materials of claim 37, A porous glass composite material comprising a gel that comprises water and a polymeric network comprising an alkoxosilane derivative, the network having a group of alterable charge, a hydrophobic group and a hydrophilic group, wherein the alkoxosilane derivative is a derivative of an alkoxosilane having the general formula (OR¹)₃Si-spacer-Si(OR²)₃, wherein R¹ and R² are the same or different and are selected from the group consisting of hydrogen, unsubstituted branched and unbranched C₁₋₂₀alkyls, substituted branched and unbranched C₁₋₂₀alkyls, unsubstituted branched and unbranched C₁₋₂₀alkenyls, substituted branched and unbranched C₁₋₂₀alkenyls, unsubstituted branched and unbranched C₁₋₂₀alkynyls, substituted branched and unbranched C₁₋₂₀alkynyls, substituted, unsubstituted, and multiple ring aryl groups, and combinations thereof, and where R¹ is selected from the group consisting of n-(CH₂)₂CH₃, n-(CH₂)₃CH₃, -CH(CH₃)₂, -CH₂CH(CH₃)₂, -CH(CH₃)CH₂CH₃, -CH₂CH(CH₃)₂, -CH(CH₃)CH₂CH₃, OPh, -CH₂CH₂OH, -CH₂CH₂OCH₃, n-CH₂(CH₂)₁₆-CH₃, n-O(CH₂)₃CH₃, OCH(CH₃)₂, OCH(CH₃)₂, OCH₂CH(CH₃)₂, OCH(CH₃)CH₂CH₃, OCH₂CH₂OH and OCH₂CH₂OCH₃.~~

5. (Currently Amended) The porous glass composite material of claim 37, A porous glass composite material comprising a gel that comprises water and a polymeric network comprising an alkoxosilane derivative, the network having a group of alterable charge, a hydrophobic group and a hydrophilic group, wherein the alkoxosilane derivative is a derivative of an alkoxosilane having the general formula $(OR^1)_3Si$ -spacer- $Si(OR^2)_3$, wherein R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen, unsubstituted branched and unbranched C_{1-20} alkyls, substituted branched and unbranched C_{1-20} alkyls, unsubstituted branched and unbranched C_{1-20} alkenyls, substituted branched and unbranched C_{1-20} alkenyls, unsubstituted branched and unbranched C_{1-20} alkynyls, substituted branched and unbranched C_{1-20} alkynyls, substituted, unsubstituted, and multiple ring aryl groups, and combinations thereof; and wherein R^2 is selected from the group consisting of $n-(CH_2)_2CH_3$, $n-(CH_2)_3CH_3$, $-CH(CH_3)_2$, $-CH_2CH(CH_3)_2$, $-CH(CH_3)CH_2CH_3$, $-CH_2CH(CH_3)_2$, $-CH(CH_3)CH_2CH_3$, OPh , $-CH_2CH_2OH$, $-CH_2CH_2OCH_3$, $n-CH_2(CH_2)_{16}-CH_3$, $n-O(CH_2)_3CH_3$, $OCH(CH_3)_2$, $OCH(CH_3)_2$, $OCH_2CH(CH_3)_2$, $OCH(CH_3)CH_2CH_3$, OCH_2CH_2OH and $OCH_2CH_2OCH_3$.

6. (Currently Amended) The porous glass composite material of claim [[37]] 5, further comprising a catalyst that is an acid catalyst or a base catalyst.

7. (Original) The porous glass composite material of claim 6, wherein the catalyst is selected from the group consisting of HCl , HNO_3 , H_2SO_4 , $HClO_4$, $NaOH$, KOH , NH_4OH , NH_3 , NH_2OH , C_5H_5N , $C_6H_5NH_2$, and combinations thereof.

8. (Currently Amended) The porous glass composite material of claim [[37]] 5, further comprising, entrained within the gel, an additive for imparting to the glass composite material a desired functional property.

9. (Original) The porous glass composite material of claim 8, comprising, entrained within the gel, two or more additives for imparting to the glass composite material a desired functional property.

10. (Previously Amended) The porous glass composite material of claim 8, wherein the additive is an alkoxosilane precursor having the general formula $R_nSi(OR)_4$, n , wherein R is the same or different and is hydrogen, unsubstituted branched and unbranched C_{1-20} -alkyl, substituted branched and unbranched C_{1-20} -alkyl, unsubstituted, branched and unbranched C_{1-20} -alkenyl, substituted branched and unbranched C_{1-20} -alkenyl, unsubstituted branched and unbranched C_{1-20} -alkynyl, substituted branched and unbranched C_{1-20} -alkynyl, or substituted, unsubstituted, and multiple ring aryl group, and $n=1$ to 3.

11. (Currently Amended) The porous glass composite material of claim 8, A porous glass composite material comprising a gel that comprises water and a polymeric network comprising an alkoxosilane derivative, and an additive entrained within the gel, for imparting to the glass composite material a desired functional property, the network having a group of alterable charge, a hydrophobic group and a hydrophilic group,
wherein the alkoxosilane derivative is a derivative of an alkoxosilane having the general formula $(OR^1)_3Si$ -spacer- $Si(OR^2)_3$, wherein R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen, unsubstituted branched and unbranched C_{1-20} alkyls, substituted branched and unbranched C_{1-20} alkyls, unsubstituted branched and unbranched C_{1-20} alkenyls, substituted branched and unbranched C_{1-20} alkenyls, unsubstituted branched and unbranched C_{1-20} alkynyls, substituted branched

and unbranched C₁₋₂₀alkynyls, substituted, unsubstituted, and multiple ring aryl groups, and combinations thereof; and

wherein the additive is an alkoxosilane precursor selected from the group consisting of

(OR)₃Si-CH₂CH₂CH₂NHCH₂CH₂NH₂; (OR)₃Si-H₂CH₂C₆H₄CH₂NHCH₂CH₂NH₂;
(OR)₃Si-R; (OR)₃Si-CH₂(CH₂)₁₆CH₃; (OR)₂Si-(R)₂;
(OR)₃Si-CH₂CH₂CH₂NHCH₂CH₂NH₂;
(OR)₃Si-CH₂CH₂CH₂N((COO-Na⁺)CH₂CH₂N(COO-Na⁺)₂;
(OR)₃Si-CH₂CH₂CH₂SH; (OR)₃Si-CH₂CH₂CH₂OCH₂CH₂OCH₂;
(OR)₃Si-CH₂CH₂C₅H₄N; (OR)₃Si-CH₂CH₂CH₂NCO;
(OR)₃Si-CH₂CH₂CH₂COOR; (OR)₃Si-ROH; (OR)₃Si-RCOOH; (OR)₃Si-RCHO;
(OR)₃Si-RCOR; (OR)₃Si-CH₂C1; (OR)₃Si-CH₂CH₂CH₂C₆H₁₂O₅CONH;
(OR)₃Si-CH₂CH₂C₅H₄S; (OR)Si-CH₂CH₂C₅H₃O; and (OR)₃Si-(CH₂)_nX wherein
X = -F, -Cl, -Br or -I and n = 1 to 20, and wherein R is hydrogen, unsubstituted
branched and unbranched C₁₋₂₀-alkyl, substituted branched and unbranched
C₁₋₂₀-alkyl, unsubstituted branched and unbranched C₁₋₂₀-alkenyl, substituted
branched and unbranched C₁₋₂₀-alkenyl, substituted, unsubstituted, and multiple
ring aryl groups, and wherein R is the same or different.

12. (Currently Amended) The porous glass composite material of claim [[8]]
11, wherein the additive is selected from the group consisting of photoactive molecules,
photoresponsive molecules, dyes, negatively charged polymers, positively charged
polymers, metal ions or complexes thereof, redox-active molecules, biologically active
molecules, biologically derived molecules and combinations thereof.

13. (Original) The porous glass composite material of claim 12, wherein the biologically active molecules are selected from the group consisting of carbohydrates, proteins, enzymes, peptides, nucleotides, DNA, RNA, cellular components and combinations thereof.

14. (Original) The porous glass composite molecule of claim 13, wherein the carbohydrate is selected from the group consisting of monosaccharides, disaccharides, polysaccharides and combinations thereof.

15. (Original) The porous glass composite molecule of claim 12, wherein the additive is a photoactive spiropyran molecule.

16. (Original) The porous glass composite molecule of claim 15, wherein the photoactive spiropyran molecule is 1'(2-carboxyethyl)-6-nitroBIPS.

17. (Original) The porous glass composite molecule of claim 12, wherein the additive is a photoresponsive molecule selected from the group consisting of flavin mononucleotide (FMN), β -nicotinamide adenine dinucleotide reduced form (NADH), bacteriorhodopsin, 8-hydroxy-1,3,6-pyrenetrisulfonic acid trisodium salt, luminol (5-amino-2,3-dihydro-1,4-phthalazonedione), bis-N-methylacridinium nitrate (N,N' – dimethyl-9,9'biacridinium dinitrate), fluorescein or its sodium salt ($C_{20}H_{12}O_5$ and/or $C_{20}H_{10}O_5Na_2$), and combinations thereof.

18. (Original) The porous glass composite material of claim 12, wherein the metal ion is a transition metal ion.

19. (Original) The porous glass composite material of claim 18, wherein the metal ion is a transition metal ion.

20. (Original) The porous glass composite material of claim 12, wherein the additive is selected from the group consisting of a polymer poly(acrylic acid), a polymer poly(itaconic acid), a polymer poly(ethylene glycol) and combinations thereof.

21. – 32. (Cancelled)

33. (Currently Amended) ~~A porous glass composite material as set forth in claim 37~~ A porous glass composite material comprising a gel that comprises water and a polymeric network comprising an alkoxosilane derivative, the network having a group of alterable charge, a hydrophobic group and a hydrophilic group, wherein the alkoxosilane derivative is a derivative of an alkoxosilane having the general formula $(OR^1)_3Si$ -spacer- $Si(OR^2)_3$, wherein R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen, unsubstituted branched and unbranched C_{1-20} alkyls, substituted branched and unbranched C_{1-20} alkyls, unsubstituted branched and unbranched C_{1-20} alkenyls, substituted branched and unbranched C_{1-20} alkenyls, unsubstituted branched and unbranched C_{1-20} alkynyls, substituted branched and unbranched C_{1-20} alkynyls, substituted, unsubstituted, and multiple ring aryl groups, and combinations thereof, and

wherein the spacer corresponds to a formula selected from a group consisting of $-[(CH_2)_3NH(CH_2)_2NH(CH_2)_3]$, $-[(CH_2)_3NH(CH_2)_3]$, and $-[CH_2CH_2CH_2NHCONHCH_2CH_2CH_2]$.

34. - 37. (Cancelled)